Chapter 2
Proposed Action and Alternatives

2.1 PROPOSED ACTION

The proposed action (the "Rebuild Project") involves removing the existing Raymond-Cosmopolis 115-kV transmission line and replacing it with a new 115-kV transmission line and installing fiber optic cable. The transmission line roughly parallels U.S. Route 101 between Raymond Substation (about 2 miles north of Raymond, Washington) north to Cosmopolis Substation in the southern part of the city of Cosmopolis (Figure 1-1). The Rebuild Project would cost approximately ~~six~~ 7 million dollars (~~2002~~ 2003 dollars).

The estimated requirements of the proposed action are summarized below. Numbers are subject to variation, depending on site-specific characteristics. Details explaining these requirements are in Sections 2.1.1 through 2.1.4.

Corridor length: 18.3 miles

Right-of-way (ROW) width: generally 50 feet

New ROW easement acquisition:
0.25 mile of additional ROW to widen existing 50-foot easement to 70 feet
0.5 mile (approximately) of additional 50-foot width

Number of structures removed: 171

Number of new structures:

Suspension	98
Angle	34
Dead-end	36
Total:	**168**

Number of guyed structures: ~~17~~ 21

Structure height above ground: ~~48~~ 50–110 feet

Structure diameter at base:

Suspension	31-42 inches
Angle and dead-end	55-70 inches

Structure bases (type and number):

Embedded	149
Concrete	19

Initial disturbed area:

Structure removal	625 sq. ft. each structure **(3 acres total)**
New structure installation	4,000 sq. ft. per suspension structure **(9 acres total)**
	12,500 sq. ft. per angle/dead-end structure **(20 acres total)**
Stringing/tensioning sites	1 acre every 2.5 miles **(7 acres total)**
Staging area	**5-10 acres**

Conductor: non-lustrous (not shiny), 0.8 inch diameter, non-ceramic insulators

Fiber optic cable: black, dull finish, 0.6 inch diameter

Overhead ground wire: 0.5 mile out of each substation

Access roads (12–14 feet wide average)**:**

Within the ROW:		
New roads	0.5 mile	1.7 acres
Improve existing roads	2.6 miles	~~5.7~~ 5.8 acres
Outside of the ROW:		
New roads	0.9 mile	~~3.1~~ 3.3 acres
Improve existing roads	0.9 mile	2.1 acres

2.1.1 Line Route and Right-of-Way

Currently there are 171 structures on the Raymond-Cosmopolis line. The existing lattice steel structures within the 50-foot ROW are numbered from Structure 1, near Raymond Substation, to Structure 167, near Cosmopolis Substation. To the north of Structure 167, two wood pole structures, numbered 19/1 and 19/2, lead into the Cosmopolis substation, and two additional wood pole structures support conductors near Structures 67 and 69.

The new line would require 168 structures. Most would be constructed within the existing 50-foot ROW, usually no more than twelve feet ahead of or behind the existing structures. However, 18 structures would be moved more than 12 feet ahead or behind, either to avoid wetlands, to move them further from waterways, or to position them outside the Highway 101 safety control zone. In addition, ~~three~~ two short segments of the transmission line would be realigned outside the existing 50-foot ROW and the transmission line would shift to the edge of the ROW in one area, as shown in Figure 2-1 and described below.

- Structures 34 and 35 would be moved to the west, outside the existing ROW, to avoid a large wetland area around Structure 35. An additional 1,832 feet of 50-foot ROW would be required, part of it within the Washington State Department of Transportation (WSDOT) ROW (which does not require an easement), and the rest owned by a private timber company. No tree clearing would be required because this area was previously logged.
- Structures 91, 92, 93, and 94 would be moved to the west outside the existing ROW. This section would be realigned because Structures 92 and 93 are within the wetlands

Figure 2-1. Proposed Realignment of Existing ROW Segments

FOR SECURITY PURPOSES

This figure was deleted from the electronic version of this document associated with Joe Creek (one structure is surrounded by water on all sides) with no access to them. An additional 3,124 feet of 50-foot ROW would be required, most of it within the WSDOT ROW (which does not require an easement), and the rest owned by a private timber company. Approximately ~~one~~ five acres of forest, which includes both red alder stands and conifers, would be cut in the realignment area and some adjacent danger trees outside the new ROW. (The acreage estimate increased from the Preliminary EA because the timber company that had a permit to cut this area informed BPA in May, 2003, that they no longer plan to cut this area, so BPA will need to purchase the timber and remove it.)

- Structures 122 to 133 would be moved slightly to the east, from 20 to 40 feet, depending on the structure, within the existing ~~50-foot~~ ROW (the width of the ROW varies in this area). They would be moved closer to the existing access road, an old railway grade, in order to minimize impacts to the Little North River. Trees that overhang the new alignment, and areas of danger trees, would need to be removed or trimmed (approximately 1.5 acres).

In addition to the easements required for the three realignment areas described above, BPA would need to acquire extra width in one area where strong winds could cause the conductor to swing outside the existing ROW. Existing easements for the segment between structures 115 and 116 (a distance of approximately 1,300 feet) would be widened to 70 feet from the current 50-foot easement, but no additional clearing would be required.

2.1.2 Structure Design

The proposed structures consist of a single steel tube that tapers to the top (Figure 2-2). A photo simulation of the proposed structures in the landscape is in Section 3.9, **Visual Resources** (Figure 3-5). All structures would have the same general appearance but would vary in size depending on their function. They are made of galvanized steel, which weathers to a dull finish after a few years. There would be three different types of structures:

- **Suspension structures** are used where the structures are in a straight alignment or where turning angles are small (less than 15 degrees). They are the lightest structures because they do not have to withstand the stresses created by angles in the conductor, and they are not located at the end of long spans. Of the 168 proposed structures, an estimated 98 would be suspension structures.

- **Angle structures** are located at a point where the line changes direction, generally at an angle of 15 degrees or larger. The stress on the structure created by the angle of the conductor requires a heavier structure; structure size increases with the size of the angle.

- **Dead-end structures** are heavier, stronger structures placed at intervals along the transmission line to independently carry the weight and tension of the conductors. Dead-end structures may either be in a straight alignment, used at angles greater than 15 degrees, or on very long spans such as canyon crossings.

The structure type also depends on whether it has guy wires. Guy wires attach at various points along the structure and are anchored at the ground to lend stability to structures subject to stress,

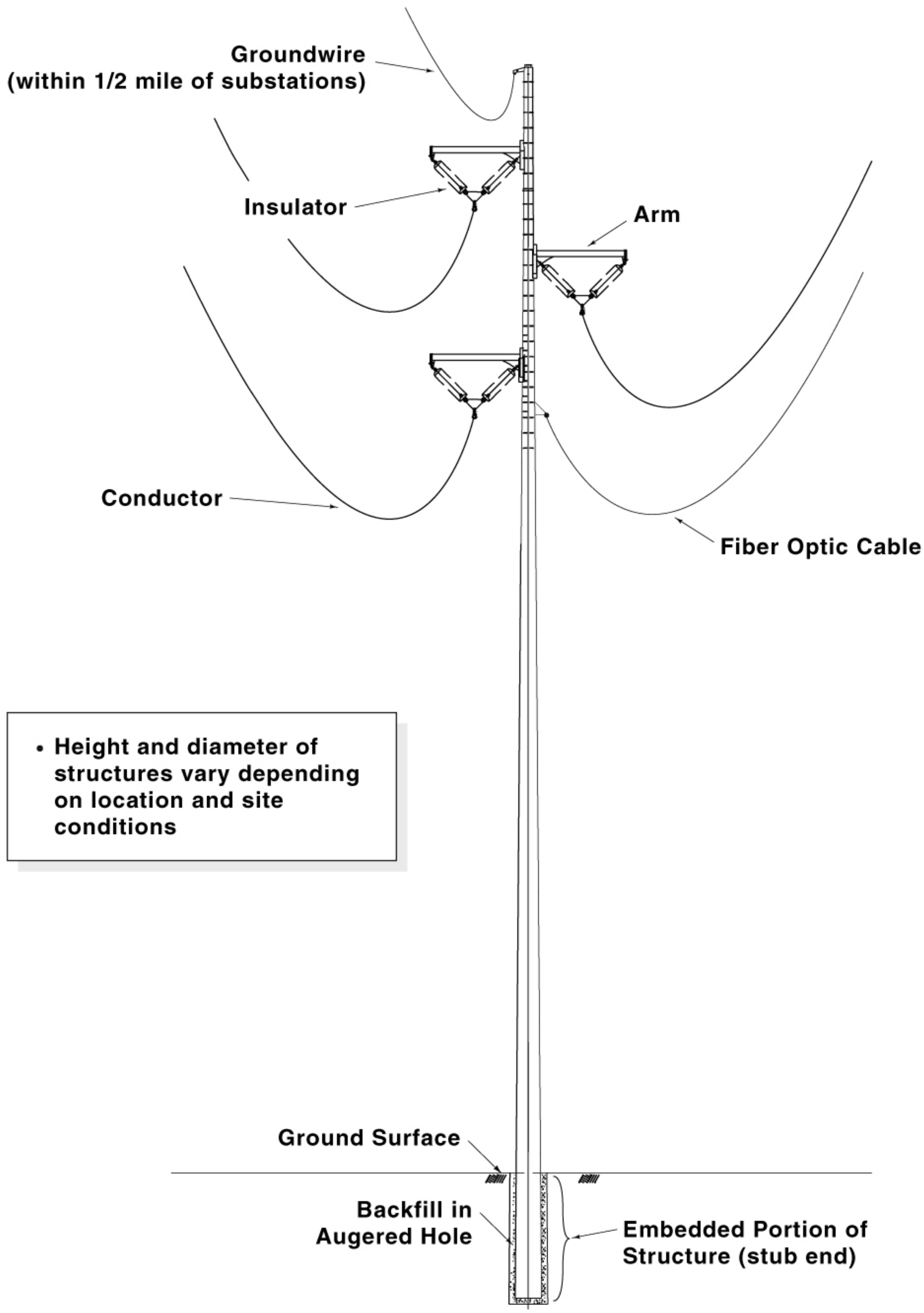

Figure 2-2
Typical Suspension Structure, Direct Embedded

such as dead-end or angle structures. Guy wires would be within the ROW, anchored no further than 110 feet from a structure.

Conductors. Alternating current transmission lines, like the proposed transmission line, require three conductors to make a complete circuit. The proposed structures have three arms; each conductor would attach to one of the arms using non-ceramic insulators. Insulators keep conductors a safe distance from other parts of the structure, preventing the electricity in the conductor from moving to other conductors, the structure, or the ground. Non-ceramic insulators are narrower than the series of disk-shaped ceramic insulators that are most often used on transmission lines; non-ceramic insulators are less susceptible to corrosion and damage from vandalism.

Conductors are made from metal and are not covered with insulating material because the surrounding air serves as insulation. The conductor would be less than one inch in diameter and non-lustrous, which means it is dulled during manufacturing to provide a non-reflective finish.

One overhead ground wire would be attached to the top of structures for the first half-mile out from each substation, to protect the structures and substations from lightning damage. If a structure is struck by lightning, the electricity is routed to the ground through the structure.

Fiber Optic Cable. A fiber optic cable would be added to this transmission line, if Pacific County PUD has funding, to provide service to Raymond. It would be attached to structures on brackets located beneath the lowest arm. Fiber optic cable is black, dull in finish, and about 0.6 inches in diameter. The lengths of fiber optic cable are joined in splice boxes, which are attached to some structures approximately 20 feet above the ground.

Two vaults that house fiber optic line components would be installed near the Raymond and Cosmopolis substations. Vaults are concrete boxes up to 6 x 6 x 6 feet and are installed either above or below the ground.

2.1.3 Access Roads

Access to tower sites for construction and maintenance would be needed at various locations along the length of the transmission line corridor, both on and off the ROW. Access road construction would consist of improvements to existing roads, construction of new roads, and construction of approaches to individual tower sites.

The existing transmission line was built in the 1920s in fairly rugged landscape. In some locations, structures were erected without creating permanent access roads. In other areas, existing roads would need to be improved to accommodate heavy construction vehicles such as cranes and concrete trucks. BPA would need to acquire easements along some existing roads.

Most of the roads improved or constructed within the ROW would be permanent. BPA prefers permanent access to structures in the event of an emergency. In some areas, such as wetlands, temporary roads would be constructed for use only during construction. Rock would be placed on geotextile, then all materials would be removed once construction is complete.

Most roads would be constructed to a finished 12- to 14-foot width, although some would be wider to allow vehicles to negotiate curves or bends in the road.

2.1.4 Construction Activities

Construction is proposed to begin at the earliest on April 1, 2004 ~~June 1, 2003,~~ and major activities would be completed by November 1, 2004 ~~2003~~, although some tree removal could occur in October 2003. The various aspects of the construction process are described below. Impacts and mitigation activities are discussed in Chapter 3.

Removal of Existing Structures. Structure removal would disturb an area approximately 25 feet by 25 feet per structure, or a total of approximately 3 acres for all structures. Most structures would be removed by digging one foot below the ground surface and cutting the tower from the base. The existing structures would be lifted onto a truck with a crane and removed from the site for recycling or disposal in an appropriate location. Structures with a concrete base would be cut at the base, leaving the concrete in place, rather than excavating the concrete. This would be done in order to minimize soil disturbance and related environmental impacts. Structures in wetlands would be cut at the ground surface and lifted or dragged out to avoid excavation in wetlands.

Installation of New Structures. New structures would either be directly embedded in the soil or bolted to a concrete base. Most would be directly embedded, except for structures that require extra stability, such as dead-end structures, angle structures that are not guyed, or structures in unstable or wet soils. For each direct-embedded structure, a hole would be augered. At first, the structure would be in several pieces, and would be brought into the work area on a large truck. The bottom piece (the stub) would be inserted into a hole and the hole back-filled with crushed rock. For most structures, the soil that is removed by the auger would be spread around the structures. However, for the two structures in wetlands, the augered soil would be removed from the site (see Section 3.7, **Wetlands)**.

The stub would protrude above the ground. Depending on structure height, the top portion would be assembled on the ground by attaching the arm pieces, then lifted into place. Most suspension structures and some guyed angle and dead-end structures would be directly embedded.

For concrete-based structures, a steel anchor bolt cage would be placed in the augered hole and the hole back-filled with concrete. The concrete base would extend 6-12 inches above the ground surface, approximately 18 inches beyond the structure.

The area disturbed for structure construction depends on the type of structure, the topography, access to the structure, and the presence of any sensitive resources in the area that restrict the work space. Estimates are shown in Section 2.1, **Proposed Action**.

Once the structure is erected, any guy wires that would be used would be installed and anchored at the base. Lighter guy wires can be inserted into the ground with screw anchors. Heavier guy wires must be anchored, generally with plate anchors—a steel plate that is embedded in concrete in the ground.

The time required to construct a structure varies. Work on the transmission line would be done in phases, with construction occurring on more than one structure at a time, in different parts of the project area.

Stringing and Tensioning Conductors. The conductors and fiber optic line would be strung from structure to structure through pulleys. Stringing and tensioning is done in several stages. Two large trucks, one with reels of conductor and one with tensioning equipment, must be positioned within the ROW. Similarly, a truck with reels of fiber optic line and one with tensioning equipment would occupy the site to pull and tension the fiber optic line. To avoid laying the conductor across roadways while stringing and tensioning, wood-pole H-frame structures would be temporarily erected at or near road crossings and on either side of a road. The conductor would be draped over these safety structures, enabling traffic to flow unimpeded along the roadway.

The location and number of pulling and tensioning sites is not known at this time; they depend on the length of conductor and fiber optic line that is on one reel. Pulling and tensioning generally are done at heavier or larger structures such as dead-end or angle structures. An estimate of acreage needed for these sites is in Section 2.1, **Proposed Action**.

Staging Areas. Staging areas are areas used to stockpile and store the structure pieces, arms, conductor spools, and other equipment during construction. There would be two staging areas, generally located near one another, covering a total of about five to ten acres. The locations are not known, but they would be in industrial/commercial land because a large, vacant, flat area would be needed.

Access Road Construction and Improvement. Roads would be widened, constructed, reshaped and/or finished to a 12- or 14-foot running surface width, with a rock or gravel roadbed. Road improvements could include grading and placing rock on existing roads. Along some existing roads, it would be necessary to clear encroaching or overhanging vegetation within the roadbed or along the side of the road (brushing). Cross drains, dip drains, or culverts would be installed to improve drainage where needed. Access to the project area would be restricted in some areas by installing locked gates at the junction of access roads and public roads.

2.1.5 Vegetation Management

Some vegetation management is included in the Rebuild Project. Danger trees would be cut in some areas between Structures 118 to 125, totaling approximately 2 acres. This area was not included in BPA's 2002 Danger Tree Removal Project because agreements could not be reached with landowners in that area. Some of these trees would need to be cut because the trees would hang into the area of the new conductor.

A narrow strip of danger trees would be cut adjacent to the 50-foot wide ROW in the realignment area between Structures 90 to 94. The area cut for the ROW and danger trees would total approximately 5 acres. The danger tree cutting areas are narrow strips, generally less than 50 feet wide. In addition, five individual danger trees would be cut near the Joe Creek tributary near existing Structures 92 and 93. These danger trees are between 50 to 110 feet from the wetlands adjacent to this tributary.

For long-term vegetation maintenance of the transmission line ROW, BPA would develop and implement vegetation management consistent with its Transmission System Vegetation Management Program and associated EIS (BPA 2000), incorporated by reference in this EA. Under vegetation maintenance criteria, no tall-growing vegetation would be allowed to grow inside the ROW except for vegetation in deep canyons when it would not interfere with the much higher conductor. Healthy, stable trees outside the ROW would be left in place, unless removal of adjacent trees would make them vulnerable to wind damage. Only those trees that are leaning toward the transmission line, are dead, or otherwise pose a potential threat would be removed. BPA maintenance crews would be responsible for managing vegetation consistent with the maintenance criteria.

2.2 NO ACTION ALTERNATIVE

The No Action Alternative is usually defined as the status quo alternative. In this case, the No Action Alternative assumes that BPA would not rebuild the transmission line and would continue to operate and maintain the existing transmission line. Construction activities associated with the Rebuild Project would not occur, and the reliability and safety concerns that prompted the proposal for action would continue to be of concern. Fiber optic cable service to Raymond would not be provided. However, maintenance activities would continue within the corridor for the existing line. Given the line's current poor condition (see Section 1.2), it is reasonable to expect that the No Action Alternative would result in more frequent and more disruptive maintenance activities within the corridor than under the proposed project.

2.3 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED STUDY

2.3.1 Route Alternatives

Examination of the project area indicated no other usable corridors between Raymond and Cosmopolis. The environmental impacts of locating the transmission line in an undeveloped corridor, versus in an already developed corridor, would be substantially greater because new ROW would have to be cleared and new roads constructed, which could lead to a variety of changes in land use and habitat for the length of the line. Direct costs also would be substantially higher due to the costs of the new clearing and roads, as well as the new easement rights that would need to be obtained.

2.3.2 Installing New Conductor Using Existing Structures

BPA considered using the existing structures to support a new higher-capacity conductor. Because the line was built in the 1920s by another utility, BPA does not have engineering design criteria that document the design strength and structural integrity of the existing structures. Due to the size and poor condition of the existing structures, BPA structural engineers concluded that they would not be able to safely support the new conductor and meet National Electric Safety Code standards.

2.4 COMPARISON OF ALTERNATIVES

Table 2-1 compares how well the Proposed Action and No Action Alternative meet the purposes (goals) of the project defined in Section 1.3, **Purposes of Action**. Detailed analysis of the environmental impacts is in Chapter 3.

Table 2-1. Comparison of the Proposed Action and No Action Alternatives

Purpose	Proposed Action	No Action
Meet transmission system public safety and reliability standards set by the National Electrical Safety Code	Meets both public safety (conductor distance from ground) and maintenance of service standards during outages of other lines in the area.	– Does not allow maintenance of service during outages of certain other lines in the area. – Risks public safety during outages due to excessive conductor sag.
Minimize environmental impacts	Construction impacts would be low to moderate, primarily short-term, and mostly can be mitigated. See Table 3-1 for a summary, Chapter 3 for a full discussion.	Avoids construction impacts but maintenance impacts would increase as existing structures and roads deteriorate. See Table 3-1 for summary and Chapter 3 for details.
Improve safety for transmission line workers	– Would reduce the need for maintenance during severe weather conditions. – Deteriorating and unstable structures would be replaced with stable structures. – Structures with no access would be relocated to provide access, making it easier and safer to reach structures during emergencies.	Continues risks to worker safety from maintenance during severe weather conditions and from deteriorating and unstable structures and lack of access.
Minimize costs	– ~~Direct construction~~ Total project costs: approximately $7 ~~6~~ million. – Reduces maintenance costs.	– Avoids materials and construction costs. – Incurs maintenance costs higher than proposed action.
Use facilities and resources efficiently	– Avoids continued use of financial and human resources on maintenance of unsound structures. – Provides multi-use structures to improve local technological infrastructure (fiber optic line installation funded by Pacific County PUD if funds are available).	– Existing unsound structures require more than normal maintenance, an inefficient use of resources. – No opportunity to use existing structures to improve local technological infrastructure.